

## Claims:

1. Process for preparing melamine by thermally converting urea,

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characterized in that

a) the reaction of urea to give melamine proceeds at least partly under reaction conditions under which at least one  
10 reactant, intermediate and/or end product is in a supercritical state, and

b) the mixture of at least one reactant, intermediate and/or end product forms a substantially homogeneous phase, and all  
15 reactants, intermediates and/or end products are in particular fully dissolved.

2. Process according to Claim 1, characterized in that the reaction proceeds at least partly at a pressure above  
20 550 bar, preferably between 600 bar and 800 bar.

3. Process according to Claim 1 or 2, characterized in that the reaction proceeds at least partly at a temperature of at least 350°C, in particular 400°C.

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4. Process according to at least one of the preceding claims, characterized in that the reaction is carried out in a continuous tubular reactor (4).

30 5. Process according to Claim 4, characterized in that the tubular reactor (4) is at least partly heated.

6. Process according to at least one of the preceding claims, characterized in that urea is used as a liquid reactant.
- 5 7. Process according to at least one of the preceding claims, characterized in that the reactant is brought to the required reaction pressure upstream of the reactor (4) by a high-pressure pump (2).
- 10 8. Process according to at least one of the preceding claims, characterized in that the reaction product of the reactor (4) is decompressed, to solidify the melamine, into a decompression vessel (6) having a pressure below 200 bar, in particular atmospheric pressure.
- 15 9. Process according to at least one of the preceding claims, characterized in that an offgas formed in the decompression vessel (6) has at least the pressure of a urea synthesis, so that it can be fed to a urea synthesis plant.
- 20 10. Process according to Claim 9, characterized in that the decompression vessel (6) is heated.
11. Process according to Claim 10, characterized by a
- 25 decompression apparatus (5), especially a valve for controlled decompression into the decompression vessel (6).
12. Process according to at least one of the preceding claims, characterized by a regulation apparatus (5) for
- 30 pressure regulation in the reactor (2).

13. Process according to Claim 10, characterized in that the regulation apparatus (5) for the reactor pressure is coupled to the decompression apparatus (3).

5 14. Apparatus for carrying out the process according to Claim 1, characterized in that the reactor (4) is designed as a tubular reactor for supercritical reaction conditions.

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15. Apparatus according to Claim 14, characterized in that the tubular reactor (4) comprises a titanium alloy.

15 16. Apparatus according to Claim 14 or 15, characterized by a decompression apparatus (5) for decompression of reaction products into a decompression vessel (6).